

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – CENTRAL COAST REGIONAL WATER BOARD
NOVEMBER 6, 2018**

ITEM 2

SUBJECT

CONSIDERATION OF A PROPOSED RESOLUTION APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE CENTRAL COASTAL BASIN TO ADOPT TOTAL MAXIMUM DAILY LOADS FOR NITROGEN AND PHOSPHORUS COMPOUNDS IN STREAMS OF THE FRANKLIN CREEK WATERSHED.

DISCUSSION

On March 23, 2018, the Central Coast Regional Water Quality Control Board (Central Coast Water Board) adopted [Resolution No. R3-2018-0006](#) amending the Water Quality Control Plan for the Central Coastal Basin (Basin Plan) to establish total maximum daily loads (TMDLs) for nitrogen and phosphorus compounds in streams of the Franklin Creek watershed. Franklin Creek is included on the 303(d) List due to excessive nitrate concentrations.

Currently, designated beneficial uses including drinking water supply (MUN), aquatic habitat (WARM, COLD, SPWN), and groundwater recharge¹ (GWR) are not being supported. For example, 272 of 288 water quality samples (95%) exceed the MUN water quality objective for nitrate. Franklin Creek also does not meet recommended guidelines (non-regulatory) for nitrate in agricultural supply water (AGR) for sensitive crop types, indicating that designated agricultural supply beneficial uses may be adversely impacted². Further, the designated groundwater recharge beneficial uses of streams within the Franklin Creek watershed provide a nexus between water quality in surface water and groundwater because locally, stream reaches and the underlying groundwater resource are both designated for MUN and AGR beneficial uses.

Central Coast Water Board staff also evaluated the potential for violations of the Basin Plan's biostimulatory substances water quality objective. Biostimulation refers to a state of excess growth of algae and/or aquatic plants due to anthropogenic nutrient inputs into an aquatic system. Excessive algal biomass may then result in biostimulatory impairments of waterbodies by adversely affecting dissolved oxygen conditions, pH, and aquatic habitat. Staff's assessment indicates that seasonal biostimulatory impairments occur within the Franklin Creek watershed; typically associated with the dry season (May through October).

The Franklin Creek watershed encompasses an area of approximately five square miles in southeastern Santa Barbara County. Tributaries to the main channel of Franklin Creek include the East Branch, West Branch, and High School Creek. Franklin Creek is one of three

¹ The Basin Plan GWR beneficial use explicitly states that the Central Coast Water Board must protect the designated groundwater recharge use of surface waters to maintain groundwater quality. As such, where necessary, the TMDL needs to protect the GWR beneficial uses of the surface waters to support and maintain the MUN or AGR beneficial uses of the underlying groundwater resource. Previously approved California TMDLs recognize the protection of the GWR beneficial use of surface waters.

² High concentrations of nitrate in irrigation water can potentially create problems for sensitive crops (e.g., grapes, avocado, and citrus) by detrimentally impacting crop yield or quality.

watersheds that drain into the Carpinteria Salt Marsh, a [Critical Coastal Area](#) as identified by multiple state and federal agencies in coordination with the California Coastal Commission.

The Central Coast Water Board's goals for establishing these TMDLs are to: 1) establish the nitrate, total nitrogen, and total phosphorus loading capacities in streams of the Franklin Creek watershed in accordance with federal Clean Water Act requirements; and 2) recommend a strategy to reduce loading of these pollutants in streams to acceptable levels, thereby ultimately rectifying the identified water quality impairments.

Pollutant Sources

Nitrogen and phosphorus compounds originate from irrigated agriculture, urban lands, stormwater sources, and natural sources. The TMDL assigns each of these source categories allocations for nitrate, total nitrogen, and total phosphorus to achieve the TMDLs. Central Coast Water Board staff estimates that irrigated agriculture contributes the majority of controllable nutrient loads to streams in the Franklin Creek watershed and this source category is not currently meeting its proposed load allocation.

Water Quality Targets

Numeric targets ascertain when and where achievement of water quality objectives occurs, and hence, when the protection of designated beneficial uses of surface waters is attained. These numeric targets are described below.

Target for Nitrate (human health standard): For impaired stream reaches that are required to support designated drinking water supply (MUN) and groundwater recharge (GWR) beneficial uses, the appropriate numeric target is a nitrate concentration of 10 milligram per liter (mg/L) (as nitrogen). This numeric target is equal to the Basin Plan's numeric nitrate water quality objective that is protective of drinking water beneficial uses.

Targets for Total Nitrogen and Total Phosphorus (biostimulatory substances):
The Basin Plan contains the following narrative water quality objective for biostimulatory substances:

"Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses."

Because natural variability influences biostimulatory problems, uniform national or state-wide numeric water quality criteria for nitrogen and phosphorus are not appropriate. Therefore, to implement the Basin Plan's narrative objective for biostimulatory substances, the Central Coast Water Board must develop technically defensible numeric water quality criteria to assess attainment or non-attainment of the narrative water quality objective. To develop this narrative objective, Central Coast Water Board staff evaluated available data, studies, established methodologies, technical guidance, peer-reviewed numeric criteria, and other information to estimate the levels of nitrogen and phosphorus that can be present without causing violations of the Basin Plan biostimulatory substances objective.

Central Coast Water Board staff proposes seasonal biostimulatory water quality targets as follows:

- Total nitrogen concentrations of 1.1 mg/L in the dry season and 8.0 mg/L in the wet season.
- Total phosphorus concentrations of 0.075 mg/L in the dry season and 0.3 mg/L in the wet season.

Targets for Dissolved Oxygen, Chlorophyll *a*, and Microcystin (nutrient-response indicators):

Central Coast Water Board staff proposes dissolved oxygen, chlorophyll *a*, and microcystin numeric targets to prevent biostimulatory conditions, and to establish primary indicator metrics to assess biological response to future nutrient water column concentration reductions. The TMDL Report discusses the nexus between nutrients and biological indicators such as dissolved oxygen, chlorophyll *a*, and microcystin.

- Dissolved oxygen targets: To protect the cold fresh water habitat (COLD) and spawning habitat (SPWN) beneficial use designations of Franklin Creek, the dissolved oxygen numeric target is the Basin Plan numeric water quality objective, which states that dissolved oxygen concentrations shall not be reduced below 7.0 mg/L at any time. For tributaries, the dissolved oxygen numeric targets is the Basin Plan numeric water quality objective for warm fresh water habitat (WARM), which states that dissolved oxygen concentrations shall not be reduced below 5.0 mg/L at any time. The Basin Plan contains an additional water quality objective for dissolved oxygen saturation that Central Coast Water Board staff proposes as a numeric target, whereby median dissolved oxygen shall not fall below 85% saturation for all waterbodies. To address excessive dissolved oxygen gas super-saturation in the water column, Central Coast Water Board staff proposes a numeric target whereby dissolved oxygen concentrations are not to exceed 13 mg/L for all waterbodies. This target is based on peer-reviewed research in California's central coast region³ and addresses the U.S. EPA "Gold Book" water quality standard for excessive gas saturation.
- Chlorophyll *a* target: Chlorophyll *a* is an algal biomass indicator. The Basin Plan does not contain numeric water quality objectives for chlorophyll *a*. A recent peer-reviewed study⁴ conducted by the Central Coast Ambient Monitoring Program (CCAMP) reports that in the California central coast region, inland streams that do not show evidence of biostimulation all remained below the chlorophyll *a* threshold of 15 micrograms per liter (µg/L). As this value is consistent with several values reported in published literature and from other regulatory programs, and as the CCAMP study is central coast-specific, Central Coast Water Board staff proposes the numeric water quality target for chlorophyll *a* is 15 µg/L for all waterbodies (i.e., water column chlorophyll *a* concentrations not to exceed 15 µg/L).
- Microcystin target: Microcystins are toxins produced by cyanobacteria (blue-green algae) and are associated with algal blooms and biostimulation in surface waterbodies⁵. The Basin Plan does not contain numeric water quality objectives for microcystin. However, the California Office of Environmental Health Hazard Assessment (OEHHA) has

³ Worcester, K., D. M. Paradies, and M. Adams. 2010. *Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters*. Surface Water Ambient Monitoring Program (SWAMP) Technical Report, July 2010.

⁴ *Ibid.*

⁵ See: U.S. Environmental Protection Agency. Drinking Water Treatability Database.

published final microcystin public health action levels⁶ for human recreational uses of surface waters. This public health action level is 0.8 µg/L for human recreational uses of water. Therefore, Central Coast Water Board staff proposes a numeric water quality target for microcystin⁷ of 0.8 µg/L (i.e., total microcystin is not to exceed 0.8 µg/L). This target is therefore protective of the water contact recreation (REC-1) designated beneficial uses. Staff found no microcystin detections in streams of the Franklin Creek watershed or in the Carpinteria Salt Marsh.

TMDL Allocations

In these proposed TMDLs, owners and operators of irrigated lands, National Pollutant Discharge Elimination System (NPDES)-permitted municipal stormwater entities, NPDES-permitted industrial and construction stormwater entities, and natural sources are assigned nitrate, total nitrogen, and total phosphorus allocations equal to the water quality numeric targets outlined previously.

Implementation Strategy

Irrigated Agriculture: Central Coast Water Board staff estimates that nutrient loads from irrigated lands are the largest source category of nutrient loading to waterbodies in the Franklin Creek watershed. Therefore, to achieve the proposed load allocations for irrigated lands, implementation of management measures will need to occur. At this time, Central Coast Water Board staff proposes that implementation and compliance with the conditions and requirements of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Agricultural Order No. R3-2017-0002) and any renewals or revisions thereof, would be sufficient evidence that implementation of the TMDLs and load allocations for irrigated lands has occurred.

The goals of implementing these load allocations are:

- Control discharges of nitrate to impaired waterbodies and groundwater⁸;
- Implement management practices capable of achieving load allocations identified in this TMDL; and
- Demonstrate progress towards achieving load allocations during the TMDL implementation phase.

NPDES-Permitted Municipal Stormwater System Discharges (MS4 entities): Municipal separate storm sewer systems (MS4s) NPDES stormwater permits will implement wasteload allocations for this source category. The TMDL considers MS4s as relatively minor loads of nitrogen and phosphorus compounds in the Franklin Creek watershed as a whole, based on Central Coast Water Board staff's source analysis and available municipal storm drain runoff water quality data. However, because these sources can potentially have significant localized effects on water quality, the MS4s are assigned wasteload allocations. The Central Coast Water Board will address nitrogen and phosphorus compounds discharged from the MS4 systems within the Franklin Creek watershed under the provisions of the State Water Resource Control Board's

⁶ California Office of Environmental Health Hazard Assessment. 2012. *Toxicological Summary and Suggested Action Levels to Reduce Potential Adverse Health Effects of Six Cyanotoxins* (Final, May 2012).

⁷ Includes microcystins LA, LR, RR, and YR.

⁸ Central Coast Water Board staff identifies shallow, recently-recharged groundwater in this TMDL as a significant source contributor of nitrate loads to streams within the Franklin Creek watershed.

General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems ([Order No. 2013-0001-DWQ](#), NPDES No. CAS000004), or any subsequent permit renewals. MS4 entities in the Franklin Creek watershed include the City of Carpinteria and Santa Barbara County.

NPDES-Permitted Industrial and Construction Stormwater Discharges: Based on evidence and information provided in the TMDL Report, staff does not expect that NPDES stormwater-permitted industrial facilities and construction sites in the Franklin Creek watershed are a significant risk or cause of the observed nutrient water quality impairments. These types of facilities are expected to be currently meeting proposed wasteload allocations. Therefore, staff has not identified additional regulatory measures for this source category at this time.

To maintain existing water quality and prevent any further water quality degradation, these permitted industrial facilities and construction operators shall continue to implement and comply with the requirements of the statewide Industrial General Permit ([Order No. 2014-0057-DWQ](#), NPDES No. CAS000001 or subsequent renewals) or the Construction General Permit ([Order No. 2012-0006-DWQ](#), NPDES No. CAS000002, or subsequent renewals), respectively.

The information outlined in the TMDL Report does not conclusively demonstrate that stormwater from all industrial facilities and construction sites meets proposed wasteload allocations. More information will be obtained during the implementation phase of these TMDLs to further assess the level of nutrient contributions to surface waters from these source categories, and to identify any further regulatory actions, if warranted, to reduce nutrient loading.

Milestones for Tracking Progress and Achieving the TMDLs

Discharges of nitrogen and phosphorus compounds are occurring at levels that impair several beneficial uses and, therefore, constitute a serious water quality problem. As such, implementation should occur at a pace to achieve the allocations and TMDLs in the shortest timeframe feasible.

Because of the nature, scale, and magnitude of the water quality problem, Central Coast Water Board staff proposes interim load allocations and wasteload allocations to establish progress towards implementation and achievement of the final load allocations and wasteload allocations presented in the TMDL Report. These interim allocations can be summarized as follows:

- First Interim Wasteload and Load Allocations: Achieve the nitrate MUN standard (10 mg/L (as nitrogen) in receiving waters that are designated MUN) within 10 years of the effective date of the TMDL (which is upon approval by the Office of Administrative Law).
- Second Interim Wasteload and Load Allocations: Achieve the wet-season (November 1 to April 30) nutrient biostimulatory target-based allocations within 15 years of the effective date of the TMDL.
- Final Interim Wasteload and Load Allocations: Achieve the more stringent dry-season (May 1 to October 31) nutrient biostimulatory target-based allocations within 25 years of the effective date of the TMDL.

The 10-year timeframe to achieve the MUN nitrate objective is based primarily on the expectation that nearly all landowners and operators of irrigated agricultural activities will have completed Farm Water Quality Plans and be implementing management practices by the end of

the three-year term of the Agricultural Order (Order No. R3-2017-0002) which was adopted on March 8, 2017. Water quality benefits resulting from implementing nutrient-control management measures (e.g., grass swales, riparian buffers, etc.) may take a few years to be realized. Ten years for the first interim wasteload and load allocations is a reasonable timeframe to implement management measures and reduce nutrient levels consistent with the allocations and the numeric targets. The basis for this estimate considers that there is evidence that, in recent years, widespread improvements to irrigation efficiency and water management have occurred in the Franklin Creek watershed.

The 15-year time frame to achieve the second interim wasteload and load allocations (which are based on the wet-season nutrient biostimulatory targets) was identified as a reasonable time frame and intermediate benchmark prior to achieving the final, more-stringent final allocations. The basis for this timeline is that the full effect of source controls (nutrient and irrigation efficiency improvements) and surface runoff treatment systems (e.g., constructed wetlands, buffer strips, etc.) are anticipated to be manifested and reflected in water quality response within 15 years. Surface water quality and runoff response to the full effect of source control and runoff treatment should be expected more rapidly than improvements to shallow groundwater quality. As noted previously, shallow groundwater is a contributing source of nutrients to surface waters; shallow groundwater moves slowly, and nitrate-polluted shallow groundwater will require longer time frames to respond to the full effects of source control measures.

The 25-year timeline to meet more-stringent dry-season biostimulatory substances allocations are based on Central Coast Water Board staff's estimates that there may be legacy nutrient loads. Legacy nutrient loads are unrelated to current practices and may originate from groundwater and baseflow, and if present will likely continue to contribute elevated nutrients in localized areas of Franklin Creek watershed surface waters for several decades. Therefore, Central Coast Water Board staff anticipates that it will take a significant amount of time for legacy pollutant loads in shallow groundwater, and the subsequent baseflow pollutant loads to stream reaches, to attenuate to acceptable levels consistent with the final TMDL allocations.^{9,10}

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan to establish total maximum daily loads (TMDLs) for nitrogen and phosphorus compounds in streams of the Franklin Creek watershed?

FISCAL IMPACT

Central Coast Water Board and State Water Board staff work associated with or resulting from this action will be addressed with existing and future budgeted resources.

⁹ For example, the U.S. Geological Survey (USGS) reports that in spite of many years of efforts to reduce nitrate levels in the Mississippi River Basin, concentrations have not consistently declined during the past two decades. USGS concludes that elevated nitrate in shallow groundwater is a substantial source contributing to nitrate concentrations in river water. Because nitrate moves slowly through groundwater systems to rivers, the full effect of management strategies designed to reduce loading to surface waters and groundwaters may not be seen in these rivers for decades (see *"No Consistent Declines in Nitrate Levels in Large Rivers of the Mississippi River Basin"* USGS News Release dated 08/09/2011).

¹⁰ For example, in a recent national study USGS researchers reported that legacy nutrients present in shallow groundwater may sustain high nitrate levels in some streams which are characterized by substantial groundwater inputs for decades to come (see Tesoriero, Duff, Saad, Spahr, and Wolock, 2013, *Vulnerability of Streams to Legacy Nitrate Sources*. Environmental Science and Technology, 2013, 47(8), pp. 3623-3629).

REGIONAL BOARD IMPACT

Yes, approval of this resolution will amend the Water Quality Control Plan for the Central Coastal Basin (Basin Plan).

STAFF RECOMMENDATION

That the State Water Board:

1. Approve the amendment to the Basin Plan adopted under Central Coast Water Board Resolution No. R3-2018-0006.
2. Authorize the Executive Director or designee to submit the amendment adopted under Central Coast Water Board Resolution No. R3-2018-0006 as approved, and the administrative record for this action to the Office of Administrative Law and the TMDL to the U.S. Environmental Protection Agency for approval.

<p>State Water Board action on this item will assist the Water Boards in achieving Goal 1 of the Strategic Plan (2010 Update Report) to implement strategies to fully support the beneficial uses for all 2006-listed water bodies by 2030. In particular, approval of this item will assist in fulfilling Strategic Plan Objective 1.1 (Strategic Plan Update 2008-2012) to prepare, adopt, and implement TMDLs, designed to meet water quality standards, for all impaired water bodies on the 2006 303(d) List by 2019.</p>
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